Notice of Allowability	Application No.	Applicant(s)	
	10/619,801	KIM, BENJAMIN JUNG	
	Examiner	Art Unit	
	Devona E. Faulk	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment filed on 9/4/2007*.

2. ☒ The allowed claim(s) is/are *1,5-7,10,11,14,21 and 22*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Response to Remarks

1. Claims 2,5,9,13,14 and 17-20 were indicated as allowable if rewritten in independent form.

2. The indicated allowability of claims 2,5,9,13,14 and 17-20 is withdrawn in view of the newly discovered reference(s) to Eriksson. Rejections based on the newly cited reference(s) would have followed. However, the applicant agreed to an examiner's amendment to place the claims in allowable form.

3. Claims 2-4,8,9,12,13,17 are cancelled.

EXAMINER'S AMENDMENT

4. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Robert R. Hubbard (Reg. No. 22,438) on 9/12/2007.

The claims are to be amended as follows:

Claims 15,16,18-20: Cancel.

Claim 1, line 18: after "captures", delete "two" and insert - - first and second - -.

Claim 1, line 21: after "coefficients", insert - - of a control filter - -.

Claim 1, line 23: before both occurrences of "data sets" in line 23, insert - - first and second - -.

Claim 1, line 24:before "data sets", insert - - control filter and said first and second".

Claim 1, line 25: after "system of", delete "two" and insert - - first and second - -.

Claim 1, line 25:before " and wherein,", insert - - P(k) and S(k), as follows:

$$X_A(k)P(k)+Y_A(k)S(k)=E_A(k),$$

$$X_B(k)P(k)+Y_B(k)S(k)=E_B(k),$$

where $\{X_A(k),Y_A(k),E_A(k)\}$ corresponds to said first data set and $\{X_B(k),Y_B(k),E_B(k)\}$ corresponds to said second data set, $Y_A(k)$ and $Y_B(k)$ represent outputs of said control filter according to the equations:

$$Y_A(k)=W_A(k)X_A(k),$$

$$Y_B(k)=W_B(k)X_B(k),$$

where $W(k)$ is the FFT of said control filter's impulse response, wherein said linear independence of said first and second equations is achieved by ensuring the inequality of $W_A(k)\neq W_B(k)$, wherein a solution of said first and second equations is given by:

$$\hat{P}(k)=\frac{E_A(k)Y_B(k)-Y_A(k)E_B(k)}{X_A(k)Y_B(k)-Y_A(k)X_B(k)},$$

$$\hat{S}(k)=\frac{X_A(k)E_B(k)-E_A(k)X_B(k)}{X_A(k)Y_B(k)-Y_A(k)X_B(k)},$$ - -.

Claim 6, line 5: before " an on-line", insert - - an adaptive filter utilizing block time-domain or equivalent frequency-domain processing, - -.

Claim 6, line 5: after "modeler", insert - - that captures first and second data sets comprising a reference signal, an error signal and generates said secondary signal, to calculate a transfer function of a secondary path, and to alter an output of a secondary source by adjusting output filter coefficients of said adaptive filter in amplitude, in phase, or in both amplitude and phase between acquisition of said first and second data sets, thereby imposing linear independence on said first and second data sets - - .

Claim 6,lines 5-6: delete "and an adaptive filter utilizing block time domain or equivalent frequency domain processing , ".

Claim 6, line 7: after "uses" , delete "said" and insert - - first and second - - .

Claim 6, line 8:before " and wherein,", insert - - P(k) and S(k), as follows:

$$X_A(k)P(k)+Y_A(k)S(k)=E_A(k),$$

$$X_B(k)P(k)+Y_B(k)S(k)=E_B(k),$$

where $\{X_A(k),Y_A(k),E_A(k)\}$ corresponds to said first data set and $\{X_B(k),Y_B(k),E_B(k)\}$ corresponds to said second data set, $Y_A(k)$ and $Y_B(k)$ represent outputs of said control filter according to the equations:

$$Y_A(k)=W_A(k)X_A(k),$$

$$Y_B(k)=W_B(k)X_B(k),$$

where $W(k)$ is the FFT of said control filter's impulse response, wherein said linear independence of said first and second equations is achieved by ensuring the inequality of $W_A(k) \neq W_B(k)$, wherein a solution of said first and second equations is given by:

$$\hat{P}(k) = \frac{E_A(k)Y_B(k) - Y_A(k)E_B(k)}{X_A(k)Y_B(k) - Y_A(k)X_B(k)},$$

$$\hat{S}(k) = \frac{X_A(k)E_B(k) - E_A(k)X_B(k)}{X_A(k)Y_B(k) - Y_A(k)X_B(k)}, \text{ - -.}$$

Claim 10, line 3: after "capture", delete "two" and insert - - first and second - - .

Claim 10, line 9: after "coefficients", insert - - of a control filter - - .

Claim 10, line 10: before "data sets", insert - - first and second - - .

Claim 10, line 11: before "data sets", insert - - first and second - - .

Claim 10, line 12: after "uses", insert - - said control filter - - .

Claim 10, line 12: before "data sets", insert - - first and second - - .

Claim 10, line 13: after "system of ", delete "two" and insert - - first and second - -

Claim 10, line 13: before " and wherein,", insert - - P(k) and S(k), as follows:

$$X_A(k)P(k) + Y_A(k)S(k) = E_A(k),$$

$$X_B(k)P(k) + Y_B(k)S(k) = E_B(k),$$

where $\{X_A(k), Y_A(k), E_A(k)\}$ corresponds to said first data set and $\{X_B(k), Y_B(k), E_B(k)\}$ corresponds to said second data set, $Y_A(k)$ and $Y_B(k)$ represent outputs of said control filter according to the equations:

$$Y_A(k) = W_A(k)X_A(k),$$

$$Y_B(k) = W_B(k)X_B(k),$$

where $W(k)$ is the FFT of said control filter's impulse response, wherein said linear independence of said first and second equations is achieved by ensuring the inequality of $W_A(k) \neq W_B(k)$, wherein a solution of said first and second equations is given by:

$$\hat{P}(k) = \frac{E_A(k)Y_B(k) - Y_A(k)E_B(k)}{X_A(k)Y_B(k) - Y_A(k)X_B(k)},$$

$$\hat{S}(k) = \frac{X_A(k)E_B(k) - E_A(k)X_B(k)}{X_A(k)Y_B(k) - Y_A(k)X_B(k)}, \text{ - -.}$$

Claim 21, line 18: after "captures", delete "two" and insert - - first and second - - .

Claim 21, line 21: after "coefficients", insert - - of a control filter - - .

Claim 21, line 22: before "data sets", insert - - first and second - -.

Claim 21, line 22: after "linear independence on said ", insert - - first and second - -.

Claim 21, line 23: after "uses", insert - - said control filter - - .

Claim 21, line 23: before "data sets to calculate", insert - - first and second - - .

Claim 21, line 24: after "system of ", delete "two" and insert - - first and second - -

Claim 21, line 25: before " and wherein,", insert - - P(k) and S(k), as follows:

$$X_A(k)P(k) + Y_A(k)S(k) = E_A(k),$$

$$X_B(k)P(k) + Y_B(k)S(k) = E_B(k),$$

where $\{X_A(k), Y_A(k), E_A(k)\}$ corresponds to said first data set and $\{X_B(k), Y_B(k), E_B(k)\}$ corresponds to said second data set, $Y_A(k)$ and $Y_B(k)$ represent outputs of said control filter according to the equations:

$$Y_A(k) = W_A(k) X_A(k),$$

$$Y_B(k) = W_B(k) X_B(k),$$

where $W(k)$ is the FFT of said control filter's impulse response, wherein said linear independence of said first and second equations is achieved by ensuring the inequality of $W_A(k) \neq W_B(k)$, wherein a solution of said first and second equations is given by:

$$\hat{P}(k) = \frac{E_A(k) Y_B(k) - Y_A(k) E_B(k)}{X_A(k) Y_B(k) - Y_A(k) X_B(k)},$$

$$\hat{S}(k) = \frac{X_A(k) E_B(k) - E_A(k) X_B(k)}{X_A(k) Y_B(k) - Y_A(k) X_B(k)}, \text{ - -.}$$

Claim 22, line 5: before " an on-line", insert - - an adaptive filter utilizing block time-domain or equivalent frequency-domain processing, - -.

Claim 22, line 5: after "modeler", insert - -that captures first and second data sets comprising a reference signal, an error signal and generates said secondary signal, to calculate a transfer function of a secondary path, and to alter an output of a secondary source by adjusting output filter coefficients of said adaptive filter in amplitude, in phase, or in both amplitude and phase between acquisition of said first and second data sets, thereby imposing linear independence on said first and second data sets - - .

Claim 22, lines 5-6: delete "and an adaptive filter utilizing block time domain or equivalent frequency domain processing , ".

Claim 22, line 7: after "uses said" , and insert - - adaptive filter and said first and second - - .

Claim 22, line 8: after "system of", delete "two" and insert - - first and second - -.

Claim 22, line 8: before " and wherein,", insert - - P(k) and S(k), as follows:

$$X_{\mathrm{A}}(k)P(k)+Y_{\mathrm{A}}(k)S(k)=E_{\mathrm{A}}(k),$$

$$X_{\mathrm{B}}(k)P(k)+Y_{\mathrm{B}}(k)S(k)=E_{\mathrm{B}}(k),$$

where $\{X_A(k),Y_A(k),E_A(k)\}$ corresponds to said first data set and $\{X_B(k),Y_B(k),E_B(k)\}$ corresponds to said second data set, $Y_A(k)$ and $Y_B(k)$ represent outputs of said control filter according to the equations:

$$Y_{\mathrm{A}}(k)=W_{\mathrm{A}}(k)X_{\mathrm{A}}(k),$$

$$Y_{\mathrm{B}}(k)=W_{\mathrm{B}}(k)X_{\mathrm{B}}(k),$$

where $W(k)$ is the FFT of said control filter's impulse response, wherein said linear independence of said first and second equations is achieved by ensuring the inequality of $W_{\mathrm{A}}(k)\neq W_{\mathrm{B}}(k)$, wherein a solution of said first and second equations is given by:

$$\hat{P}(k)=\frac{E_{\mathrm{A}}(k)Y_{\mathrm{B}}(k)-Y_{\mathrm{A}}(k)E_{\mathrm{B}}(k)}{X_{\mathrm{A}}(k)Y_{\mathrm{B}}(k)-Y_{\mathrm{A}}(k)X_{\mathrm{B}}(k)},$$

$$\hat{S}(k)=\frac{X_{\mathrm{A}}(k)E_{\mathrm{B}}(k)-E_{\mathrm{A}}(k)X_{\mathrm{B}}(k)}{X_{\mathrm{A}}(k)Y_{\mathrm{B}}(k)-Y_{\mathrm{A}}(k)X_{\mathrm{B}}(k)}, \text{ - -.}$$

Allowable Subject Matter

5. Claims 1,5-7,10,11,14,21,22 are allowed.

The following is an examiner's statement of reasons for allowance: Regarding claims 1, 6,10,21 and 22, prior art Eriksson (US Patent 4,987,598) discloses a reference sensor operable to receive a reference signal related to a primary noise and to generate a primary signal in response; a secondary source operable to generate a primary signal in response; an error sensor operable to receive a residual signal that is a superposition of said primary noise and a secondary noise at the location of said error sensor, and a controller operable to receive said primary signal and said error signal and to generate said secondary signal while performing on-line noninvasive secondary path modeling, said controller comprising an on-line noninvasive secondary path modeler operable to receive said primary signal, said secondary signal and said error signal for the purpose of calculating a secondary path model { Eriksson discloses an active noise control system comprising an reference sensor 10 generating a primary signal 42, a secondary source 14, an error sensor 16 generating an error signal 44 and controller comprising adaptive filter model 40, adaptive filter 202, adaptive filter 210, and associated adders 221 and 218. The controller receives the primary signal 42 and error signal 44 and generates the secondary signal 46. Noninvasive secondary path modeling is accomplished by adaptive filters 202 and 210, which receive primary signal 42 (input to adaptive filter 202), secondary signal 46 (input to adaptive filter 210), and the error signal 44 (input to adder 221). As disclosed in column 2 lines 17-40 discloses that the

adaptive filters 202 and 210 calculate the secondary path model. Furthermore regarding claim 10 Eriksson discloses that the secondary source is adjusted by filter 232 (T copy) which changes the amplitude and phase of the secondary source according to the secondary path model T.} Prior art Zhang et al. (US 6,847,721) discloses an active noise control system with on-line secondary path modeling. Prior art Kuo (US 6,418,227) discloses an active noise control system and method for on-line feedback path modeling.

Regarding claim 1,6,10,21 and 22 ,the prior art or combination thereof fails to disclose or make obvious, the invention as a whole, particularly, thereby imposing linear independence on said data sets, wherein said secondary path modeler uses said first and second data sets to calculate said secondary path model algebraically in a system of first and second equations-two unknowns, P(k) and S(k), as follows:

$$X_{\mathrm{A}}(k)P(k)+Y_{\mathrm{A}}(k)S(k)=E_{\mathrm{A}}(k),$$

$$X_{\mathrm{B}}(k)P(k)+Y_{\mathrm{B}}(k)S(k)=E_{\mathrm{B}}(k),$$

where $\{X_A(k),Y_A(k),E_A(k)\}$ corresponds to said first data set and $\{X_B(k),Y_B(k),E_B(k)\}$ corresponds to said second data set, $Y_A(k)$ and $Y_B(k)$ represent outputs of said control filter according to the equations:

$$Y_{\mathrm{A}}(k)=W_{\mathrm{A}}(k)X_{\mathrm{A}}(k),$$

$$Y_{\mathrm{B}}(k)=W_{\mathrm{B}}(k)X_{\mathrm{B}}(k),$$

where $W(k)$ is the FFT of said control filter's impulse response, wherein said linear independence of said first and second equations is achieved by ensuring the inequality of $W_{\mathrm{A}}(k)\neq W_{\mathrm{B}}(k)$, wherein a solution of said first and second equations is given by:

$$\hat{P}(k)=\frac{E_A(k)Y_B(k)-Y_A(k)E_B(k)}{X_A(k)Y_B(k)-Y_A(k)X_B(k)},$$

$$\hat{S}(k)=\frac{X_A(k)E_B(k)-E_A(k)X_B(k)}{X_A(k)Y_B(k)-Y_A(k)X_B(k)},$$

and wherein an equation derived from said algebraic calculation is modified to account for spectral leakage and narrowband effects.

Claims 5,7,11,14 are allowed due to dependency on claims 1,6,10.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devona E. Faulk whose telephone number is 571-272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DEF

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